

**Kitakyushu Initiative for a Clean Environment
Successful Practices
Water Pollution Control in Weihai (China)**

Target area: Wastewater management

Successful Practices No:

Period: From the early 1980's to 2000

1. Weihai city

- i. Weihai is a coastal city, located in the east top of Shandong Peninsula, covering an area of about 5436Km², and having a population of 2.45M
- ii. Weihai is developing very rapidly, as from 1987 to 2000, GDP increased from 2.56billion RMB to 56billion RMB, urban population increased from 71,000 to 300,000, and developed urban area increased from 13.1Km² to 43.6Km²
- iii. The environmental quality has also been maintained, as in 1990, the city got the honor of National Sanitary City, number 1 of China, in 1997, got the honor of Environmental Protection Model City, first cohort (only 6 cities) of China, and in 1995 and 2000, two times got the award of The Best Example For Improving Living Environment In The World from UN Human Living Center
- iv. Table 1 shows the main development and environmental indicators of Weihai

Table 1. Main development and environmental indicators

ECONOMIC INDICATORS	
Percentage increase of GDP	2.56 billion (1987) to 56 billion (2000)
Developed urban area	13.1Km ² (1987) to 43.6 Km ²
ENVIRONMENTAL INDICATORS	
● Marin water quality along Weihai coastline (1996-2000)	
PH	7.9 to 8.11
DO	8.19 to 6.83
Non-organic N	0.081 to 0.16 mg/l
Non-organic P	0.009 to 0.012 mg/l
Copper	0.008 to 0.006 mg/l
Lead	0.003 to 0.002 mg/l
Oil	0.1 to 0.016 mg/l
● Water pollution control capacity (1995-2000)	
Rate of industrial waste water meeting standard (%)	74.17 to 98.8
Rate of treated domestic waste water (%)	17.6 to 56.6
Rate of reused domestic waste water(%)	74.2 to 81.4
Per unit GDP water consumption (ton/million RMB)	2570 to 1256

2. Environmental challenge

- i. With an annual precipitation of 700mm and no external water source, Weihai is an area that experiences water shortages
- ii. The available water resources are about 548 m³ per capita, which is 1/5th the average of China (2600 m³), and there is no access to the external water
- iii. When water resources are scarce, the capacity to purify emitted pollutants weakens and water quality deteriorates, leading to a decrease in the amount of water resources that can be used by residents
- iv. How to preserve the rare water resources and protect the ocean water is a tough task for the Weihai government, because the coastline is long with 985km. The discharged wastewater increased from 1723 Million ton in year 1996 to 2119 million ton in year 2000. Development along the coastline was very fast, factories and hotels treated wastewater

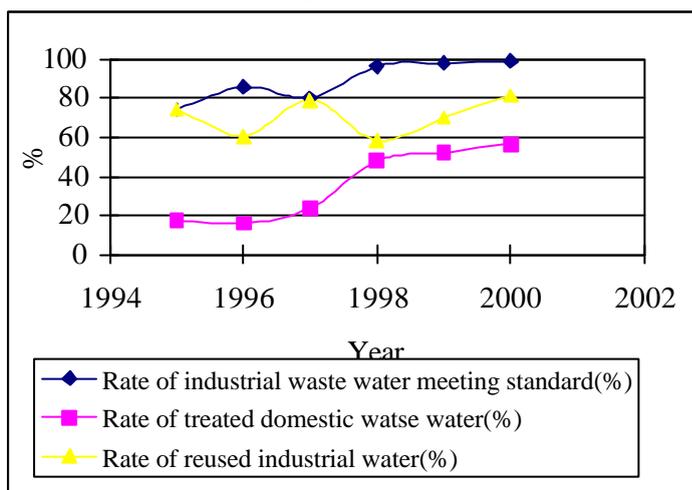
individually but the efficiency of their facility was low. That caused a serious pollution for marine water, COD and oil were not meeting the standard of environmental function zone

3. Achievements

A. Construction of wastewater treatment plants

- i. Weihai constructed the sewerage treatment plant at very early stage (in 1985). The capacity of wastewater treatment improved remarkably (Fig 1). Weihai increased the water reuse rate for saving water resource, and reducing the water pollution

Fig 1. Water Pollution Improvement in Weihai



- ii. Weihai began construction of a sewerage treatment plant in 1985, followed by two others in 1995 and 2000. A fourth sewerage treatment plant is planned. Details are given in Table 2.

Table 2. Weihai Sewerage Treatment Plants Construction

		The first sewerage treatment plant	The second sewerage treatment plant	The third sewerage treatment plant	Planning
Capacity		Phase 1: 5000 tons per day (1985) Phase 2: 10,000 tons per day (1990)	80,000 tons per day (1995)	10,000 tons per day (2000)	50,000 tons per day
Total investment		12 million RMB	120 million RMB	50 million RMB	
Investment method	Construction	Government revenue	Industries: 700 RMB per ton per day		Possibility of BOT
	Operation	Government revenue	0.15 RMB per ton (1995) 0.2 RMB for residents, 0.4 RMB for industries (2000)		Possibility of lease and concession contract projects for market based operation

B. Regulations/voluntary approaches

- i. Projects with high water consumption are not permitted
- ii. Cleaner production process must be introduced

- iii. Paper mill factory and the heating-power station to use recycled water
- iv. All the new and renovated buildings must use the equipment that can meet the water saving standard
- v. Establish using water saving equipment in household must be followed from house designing; Spreading the water saving new technology, new process and new equipment
- vi. Enhance the management of ship by transportation, ocean, and fishery department

C. Education / public awareness

- i. Encourage citizens to use water saving equipment
- ii. Change the screw tap to one action tap; Big volume urinal to small volume
- iii. Some householders even store the water after wash hands or vegetable for running urinal
- iv. Encourage citizens to use the treated waste water to plant trees, and the grassy land
- v. Construct purification plant widely used for vegetation, industry cooling, road/street washing, etc.
- vi. Organize Volunteers to collect the garbage at the seaside and raise the environmental awareness
- vii. Construction of parks around marine areas

D. Finance

- i. Weihai is uses polluter pays principle to solve financial problem
- ii. **Financing construction of second sewerage treatment plant:** Industry should pay 700 RMB per ton per day according to discharge volumes that cover part of real cost (Real cost: 2000-3000 Yuan); this is much less than investment for the individual facility
- iii. **Running cost:** The government allows users to pay only 0.15 RMB per ton at the beginning. In 2000, the government raised it to 0.2 RMB for residents and 0.4 RMB for industries; This covers 30% and 60% of actual costs (Actual running cost: 0.6-0.7 Yuan per ton)
- iv. Currently, Weihai is planning to construct a fourth sewerage treatment plant by BOT project, and apply the market mechanism for running the facility by lease or concession contract with a private company
- v. The government raised the price of the water three times during the last two years (1999-2000) from 0.8 RMB to 1.8 RMB per ton. At that time, the government used a progressive pricing schedule that raises the cost per unit of water service in the blocks of higher consumption; it can even reach 40 RMB per ton. This economic method not only can lead users to conserve water but also to collect funds to invest in future activities.

4. Successful practices

- i. In 1979, at the start of high economic growth, the Chinese Government enacted the Environmental Conservation Law and began full-scale environmental protection activities. These policies were highly thought of in regional cities and provided an opportunity to introduce public funds into environmental protection activities. Weihai, taking advantage of this opportunity, carried out investment in the improvement and construction of environmental infrastructure. Additionally, PPP was introduced, fees were collected, and funding was secured for future projects
- ii. According to the regulatory system, the construction of industries that use large amounts of water is not approved and other businesses and industries are obligated to carry out water conservation and recycling
- iii. Increase of recognition of water conservation through policies that introduce economic methods like graduated increases of water supply fees (progressive pricing)
- iv. Additionally, while carrying out innovative recycling and reuse activities, Weihai provided residents with information on concrete water saving technology and equipment and made efforts to actively promote those activities

5. Transferable practices

- i. **Planning and implementation:** Construct sewerage treatment plant at the earlier stage which can help local governments to avoid the accumulation of environmental problems, and this also helps to save the construction cost
- ii. **Pricing policies:** Use polluter pays principle and economic tools for pricing policies, which are necessary to enhance the public funding for construction and maintenance of the facilities
- iii. **Private sector:** Public-Private Partnerships (PPP), or Private Financing Initiatives (PFI) through various incentives like build-operate-transfer (BOT), tax holidays, and etc.